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Research Article

Evaluation of the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) for Student Teacher Approaches to Learning

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Abstract

A deep approach to learning is essential for student academic achievement and several studies demonstrate a significant association between such an approach to learning and student academic performance. However, findings from some empirical studies in this domain are inconsistent and the main objective of this study was to determine the feasibility of application of the Biggs (2001) Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) for the diagnosis and monitoring of teacher-student approaches to learning. Also, the aim of this study was to examine the association of the different approaches to learning with student reading habits and literacy skills. The sample included 202 undergraduate teacher education students. The study found that both, male and female students at the year of study have similar deep and surface approaches to learning. This initial evaluation of the R-SPQ-2F indicates that the questionnaire has acceptable internal consistency and is a promising short instrument for the diagnosis of student teachers' deep and surface approaches to learning. Results are discussed with reference to a procedure that combines qualitative and quantitative data to increase the diagnostic validity of student learning approaches. Based on the findings of this study, it seems that the R-SPQ-2F scale can be used as a reliable instrument that can help educators diagnose and encourage the development of student teacher approaches to learning, that is a significant contributing factor to their academic performance and teaching practice.

Keywords: *study skills, deep and surface approaches, university students, cross-cultural comparison*

1. Introduction

Learning approaches are the study strategies that learners adopt to master a task (Garrison, Andrews, & Magnusson, 1995). The term 'approach' signifies the intention and the method through which information is processed. Biggs, Kember, and Leung (2001) identified two main approaches to learning, a deep and a surface approach. Learners adopting a deep approach are intrinsically motivated and search for meaning by integrating new information with existing knowledge. Surface learners adopt a reproductive conception of learning with passive acceptance of ideas and information (Hassall & Joyce, 2001). A deep approach to learning is vital for student academic achievement and several studies demonstrate a significant association between such an approach to learning and student academic performance (e.g. Bliuc, Ellis, Goodyear, & Hendres, 2011; Cetin, 2016; De la Fuente, Pichardo, Justicia, & Berbén, 2008).

Biggs et al. (2001) constructed a shortened version, of the original Study Process Questionnaire (SPQ) (Biggs, 1987) and this version dealt specifically with surface and deep approaches to learning. The resultant two-factor version of the SPQ, the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) could be administered quickly and easily by teachers, for use in monitoring teaching contexts. The redacted test consisted of two deep and two surface factors each

with 10 items. Within each of these two factors, it was possible to distinguish strategy and motive subscales. Biggs et al. (2001) report good fits for models for the four subscales and concluded that the items were unidimensional for each of the four subscales. Cronbach alpha values for the four subscales ranged from .57 to .72. The two-factor model has been reported to have a better fit than the previous three-factor solution (surface, deep and achieving) of the original SPQ (Kember & Leung, 1998; Zhang, 2000).

Taher and Jin (2011) used this revised format of the test (R-SPQ-2F) to assess 208 students attending a part-time MBA programme at a university in China. They reported that while the mature participants were generally struggling to fulfil their adult social, professional and educational obligations, they were also driven by a strong desire to develop a deep understanding of the concepts taught on the course. Thus, they obtained high scores on the deep learning approach (35 scores) and somewhat lower scores (approximately 26) for the surface learning approach. Similar results had been reported in a study with a comparable population by Cheng (2001) ten years earlier.

Empirical studies in this domain produced mixed results (e.g. Habel, 2012; Justicia, Pichardo, Cano, Berbe´n, & De la Fuente, 2008) since these studies failed to confirm the test's four-factor structure. This might be caused by the lack of validated instruments for diagnostics of student approaches to learning. An evaluation of the R-SPQ-2F also failed to confirm the structure in the Spanish translation of this questionnaire. Only the two-factor structure was found to be replicable in this new context and its other factor structures were called into question along with a lack of differentiation between the remaining subscales of the test (Justicia et al., 2008). On the other hand Stes, De Maeyer, and Van Petegem (2013) claimed that the test retained its sensitivity in a Dutch context but called the test's goodness of fit for a two-factor model into question. They proposed that the additional use of qualitative data, obtained through interviewing participants could increase the validity of the questionnaire when this is used outside of the culture it was developed for.

Regarding the metric characteristics, a recent study (Shah et al., 2016) confirmed that the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) measures of deep and surface approaches to learning have acceptable internal consistency coefficients ranging from .71 to .72. This resembles the original validation study (Biggs et al., 2001) which found a similar internal consistency for the deep approach (.73) but a slightly lower coefficient for the surface approaches to learning (.64).

Considering the inconsistent empirical findings from the literature, the main objective of this study was to determine the feasibility of application of the R-SPQ-2F for diagnosis and monitoring of teacher-student approaches to learning. The second aim of this study was to examine the association of the different approaches to learning with student learning habits and the suitability of this questionnaire to the education students of different age and gender attending a teacher education course in Malta.

2. Research design

2.1 Participants

The participants in this study were all students who were attending the same teacher education course at different year levels but not the final year. This course attracts a relatively homogenous cohort of students who are largely first-time students at University. All students were Maltese first language speakers and all were ethnically Maltese. In total, there were 202 undergraduate teacher education students who were in the first three years of their four-year degree course: 59 students from the first year, 64 students from the second and 79 from the third year of the course.

2.2 Instruments

The instrument used for measuring approaches to learning was the R-SPQ-2F (Biggs et al., 2001). The questionnaire examines two primary learning approaches: the deep approach that includes deep motive and deep strategy and the surface approach, which includes surface motive and surface strategy. (A–E). It asks respondents to express their approaches to learning on a 5-point Likert-type scale ranging from 'never or only rarely true of me' to 'always or almost always true of me'. The instrument was administered in the original form in English that is the official teaching language of the university.

A subsample of the participants completed a questionnaire to collect data about student demographic characteristics, self-reported academic ability, their overall literacy skills and reading habits comparable to the Progress in International Reading Literacy Study (PIRLS) 2011 (Mullis, Martin, Foy, & Drucker, 2012) student survey but adapted to older respondents. The study was approved by the institutional research ethics board and the participants were invited to participate voluntarily and anonymously.

2.3 Procedures

The questionnaire was administered at the beginning of the 2015-2016 academic year and participation was voluntary as required by the institutional ethics standards. The first year students were coming straight from Sixth Form College and had no exposure to university learning while the second year respondents had one full year of exposure to university teaching and third year students had two full years' exposure at the time of assessment.

Statistical analysis was conducted by using the SPSS and the basic descriptive measures used were, percentages, averages, cross-tabulations, correlations, independent samples t-tests, and analysis of variance (ANOVA) to determine the difference between students of different gender and year of study. The study also applied reliability analysis to determine the internal consistency of the applied R-SPQ-2F questionnaire sub-scales and the main scales.

3. Results

3.1 Gender differences

To guard against certain cells having low cell counts (Yates, Moore, & McCabe, 1999) the Likert scale was collapsed into a three-point scale (never or sometimes, about half the time, frequently or always). While there were no gender differences evident in the two mains scales, a gender difference was evident in one of the items. Our Chi-square (χ^2) test revealed that the percentage of students who demonstrated a greater tendency towards deep orientation to learning (spend a lot of free time finding out more about interesting topics, which have been discussed in different classes) differed by gender ($\chi^2(2) = 6.6$, $p < 0.05$). The effect size was .27 is considered to be moderate (Field, 2013). A post hoc analysis with Bonferroni correction (Beasley & Schumacker, 1995) identified that the significant difference between males and females in regard to the amount of free time spent on 'finding out more about interesting topics which have been discussed in different classes' occurred in the "about half the time" choice of answer where 17 females and only 1 male described themselves as falling into this category.

The study found that both, male and female students scored similarly on the two main scales of the R-SPQ-2F questionnaire. However, due to a number of missing responses, the analysis was conducted on a smaller number of participants. An independent samples t-test on 89 of the respondents returned no significant differences between the genders.

3.2 Year of study differences

The study found that students at different stages in their studies had similarly developed deep and the surface approaches to learning as shown in Table 1 below. While there seems to have been minimal variation between year levels in the Deep Approach (DA) to learning, the Surface Approach (SA) was consistently invariable. The analysis of variance did not find any significant differences between the students at the different years of study.

Table 1. Average score and standard deviation on Deep and Surface Approach by year

	Deep Approach	Surface Approach
Year 1 (n=59)	29.5 (5.58)	25.3 (6.34)
Year 2 (n=64)	28.4 (6.18)	25.8 (6.25)
Year 3 (n=79)	30.3 (5.47)	25.5 (6.17)

At the level of individual questionnaire items, the results were invariant regarding the student year of study except for a deep approach item (I feel that virtually any topic can be highly interesting once I get into it) which indicates that the students more frequently become highly interested in various topics when they get involved in learning ($\chi^2(4) = 10.4$, $p < 0.05$). The effect size was .16 and this is considered to be weak (Field, 2013). A post hoc analysis with Bonferroni correction (Beasley & Schumacker, 1995) identified a type 1 error in the apparent significant difference between the year groups.

Overall, the results demonstrate that the questionnaire scores are invariant in regard to gender and the year of study, indicating that the R-SPQ-2F main scales are suitable for both, male and female students at the different stages of their study programme.

3.3 Other differences

Further analysis found that the deep approach to learning was positively associated with student self-reported reading habits, their self-assessed literacy skills, and their self-reported overall ability. Students with higher scores on the deep approach to learning scale more frequently enjoyed reading ($F(3, 72) = 3.36$, $p = .023$), considered reading as an interesting rather than a boring activity ($F(3, 72) = 4.63$, $p = .005$) and read even if they were not required to do so ($F(3, 72) = 4.40$, $p = .007$). Overall, they showed more positive attitudes towards learning in all six questions related to their learning habits and attitudes towards reading.

The analysis also shows that the deep approach to learning is positively associated with self-reported literacy skills ($r(76) = .243$, $p < .05$) and self-reported overall ability ($r(76) = .332$, $p < .005$). Additional t-tests confirmed this finding, demonstrating that the students who self-report above-average literacy skills ($t(73) = 2.27$, $p = .026$) and ability ($t(74) = 3.03$, $p = .003$) score higher on the deep approach to learning scale.

Our evaluation of the internal consistency of the R-SPQ-2F questionnaire shows similar results as the previous studies that found acceptable alpha coefficients for the Deep and Surface Approaches and lower internal consistency for Deep Motive, Deep Strategy, Surface Motive and Surface Strategy (Kember & Leung, 1998; Zhang, 2000).

Table 2. Cronbach's Alpha coefficients for the main scales and subscales of the R-SPQ-2F

R-SPQ-2F Scales and subscales	Cronbach's Alpha
Deep Approach (DA)	**.73**
Deep Motive (DM)	.49
Deep Strategy (DS)	.63
Surface Approach (SA)	**.75**
Surface Motive (SM)	.56
Surface Strategy (SS)	.61

As Table 2 shows, the evaluation of the R-SPQ-2F questionnaire indicates that the questionnaire represents an instrument with acceptable internal consistency for diagnosing the student teachers' Deep and Surface Approaches to learning (alpha=.73 and .75 respectively), but the subscales of this questionnaire (Deep Motive, Alpha = .49, Deep Strategy = .63, Surface Motive = .56, and Surface Strategy = .61) have relatively low internal consistency and require some modifications and/or additional questions to provide reliable diagnostic information.

4. Discussion and Conclusions

In sum, this study confirmed the findings of the other previous studies related to the usability of the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F). While no direct comparison can be made with the findings of Taher and Jin's (2011) study, the participants in the present study indicated somewhat lower levels of the deep approach to learning in comparison with mature students involved in second-degree studies in China. This may be due to the age and low levels of responsibility that they carried compared to the participants in Taher and Jin's (2011) study who were older, married and had heavy family responsibilities. On the other hand, the sample of the undergraduate university students from Malta showed similar levels of a surface approach to learning as the participants from the Taher and Jin's study, indicating that they were yet to develop deeper study skills as they matured.

Habel (2012) and Justicia et al. (2008) made reference to the fact that their studies did not confirm the test's four-factor structure. However, they confirmed the two major scales that led them to concentrate on the two main factors. The internal consistency of the deep and surface approach scales in their study was acceptable. The internal consistency of the two main scales in our study was similar to the findings reported by Shah, et al. (2016) and Biggs et al. (2001) and confirmed the findings from the previous studies of the R-SPQ-2F questionnaire. Similarly to the study conducted by Stes et al. (2013), the R-SPQ-2F results from our study demonstrate that the questionnaire has good construct validity and acceptable internal consistency.

This exploratory study indicates a number of procedures that could be included in the next step in the validation of this instrument across different cultures. These can include the administration of this questionnaire to various student cohorts such as those in the humanities, social sciences and STEM areas of study. Moreover, profiles of student groups could be compared with tasks that examine respondents' problem-solving ability at various levels of complexity requiring

deep and surface approaches. Similarly, additional individual face-to-face interviews could enhance the validity of the measure and increase the diagnostic validity of this short instrument that can provide valuable information to support student learning that is a significant factor contributing to their academic performance at the post-secondary level.

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